AEDC

Arnold Engineering Development Center
Arnold Air Force Base, Tenn. 37389

An Air Force Materiel Command Test Facility

Test Before Flight

Arnold Engineering Development Center (AEDC) is the most advanced and largest complex of flight simulation test facilities in the world with 58 aerodynamic and propulsion wind tunnels, rocket and turbine engine test cells, space environmental chambers, arc heaters, ballistic ranges and other specialized units.

Twenty-seven of the center's test units have capabilities unmatched elsewhere in the United States; 14 are unique in the world. Facilities can simulate flight conditions from sea level to 300 miles and from subsonic velocities to Mach 20.

Photo no. 98-047709

An aerial view of the Arnold Engineering Development Center

The AEDC mission is to:

- Test and evaluate aircraft, missile and space systems and subsystems at the flight conditions they will experience during a mission to: help customers develop and qualify the systems for flight, improve system designs and establish performance before production, and to help users troubleshoot problems with operational systems;
- Conduct a research and technology program to develop advanced testing techniques and instrumentation and to support the design of new test facilities. The continual improvement helps satisfy testing needs and keeps pace with rapidly advancing aircraft, missile and space system requirements;
- Maintain and modernize the center's existing test facilities.

AEDC, an Air Force Materiel Command facility and an important national resource, has contributed to the development of practically every one of the nation's top priority aerospace programs including the Atlas, Titan, Minuteman and Peacekeeper ICBMs, the space shuttle, space station, and Projects Mercury, Gemini and Apollo.

Aircraft include the Joint Strike Fighter, A-10 Thunderbolt II, F-15 Eagle, F-16 Fighting Falcon, F/A-18 Hornet & F/A-18 E/F Super Hornet, F-22 Raptor, F-105 Thunderchief, F-111 Aardvark, F-117A Nighthawk, C-5 Galaxy, C-17 Globemaster III, C-141Starlifter, B-1B Lancer, B-2 Spirit, B-52 Stratofortress, B-58 Hustler, X-15, X-29, X-32 & X-33, X-35, XB-70 Valykire.

Satellites include GPS, MAPS,and GOES weather satellite.

Missiles include the submarine-launched ballistic missiles Polaris, Poseidon and Trident, plus the Tomahawk, Air-Launched Cruise Missile and the Advanced Medium-Range Air-to-Air Missile.

Customers include the Department of Defense, Army, Navy and Air Force organizations; the National Aeronautics and Space Administration, both domestic and foreign private industry, allied foreign governments and educational institutions.

HISTORY

Arnold Engineering Development Center is named for the man responsible for its conception—General of the Air Force Henry H. "Hap" Arnold. Shortly before the end of World War II, General Arnold asked Dr. Theodore von Karman, one of history's great aeronautical scientists, to form a Scientific Advisory Group to chart a long-range research and development course for the future U.S. Air Force.

Dr. von Karman sent a task force from his newly formed group to Germany to determine how the Germans had made such rapid progress in developing high-performance jet aircraft and rockets. One member of the task force, Dr. Frank Wattendorf, was responsible for surveying wind tunnels and ground test facilities.

On his flight home, Dr. Wattendorf wrote a memo that proposed using captured German test facilities to establish a new air engineering development center that would consolidate the best civilian and

Photo no. 51-02

The moment of dedication at the Arnold Engineering Development Center came on June 25, 1951, when President Harry Truman pulled a cord to draw aside the curtain revealing the dedicatory plaque mounted on a large granite rock. Mrs. Henry Arnold, widow of General of the Air Force H. H. "Hap" Arnold, looks on. The event took place on the 65th anniversary of the General's birth.

military scientists and state-of-the-art test facilities – a center to properly test and evaluate weapon systems needed to guarantee superiority of American airpower and thereby the national security. Dr. Wattendorf's "Trans-Atlantic Memo" became the blueprint for AEDC.

Construction of the Air Engineering Development Center began in June 1950 in Middle Tennessee. The site was chosen because of the availability of land, water and power; land to buffer surrounding communities from expected test hazards and noise and to accommodate growth for future test facilities; water to cool the rapidly flowing air and hot exhaust gases; and electricity to power huge motor drive systems.

On June 25, 1951, the center was dedicated by President Harry Truman and renamed in honor of General Arnold. The first test complex, the Engine Test Facility, went into operation in 1953.

AIRCRAFT SYSTEMS TESTING AT AEDC

Modern military aircraft run the gamut–from subsonic cargo transports and air refueling tankers to highly maneuverable supersonic bombers and fighters. Requirements for higher performance, low observable (stealth) and multi-purpose aircraft have given rise to designs that are increasingly complex.

AEDC is concerned with determining the operating characteristics of an airframe, propulsion system, and externally-carried stores such as munitions, sensors and fuel tanks.

Sub-scale and full-scale hardware is exposed to high-speed and simulated altitude flight conditions to:

- Improve the performance, operability, reliability and durability of turbine engines;
- Refine airframe designs for improved aerodynamic performance and propulsion system integration;
- Determine the performance characteristics of an aircraft carrying external stores;
- Determine the separation characteristics of munitions and fuel tanks to make sure they do not damage the aircraft when they are released and that they hit the intended target;
- Minimize damage or loss of aircraft due to birdstrikes.

AEDC also supports commercial aviation with development and certification testing of the new-generation large turbofan commercial engines.

SPACE LAUNCH AND MISSILE SYSTEMS TESTING

Space launch vehicles have assured our access to space since the 1960s, and intercontinental ballistic missiles are an essential element of the strategic defense force. These systems are comprised of multi-stage solid- and liquid-propellant rockets that must work precisely as designed. Slight errors in performance can

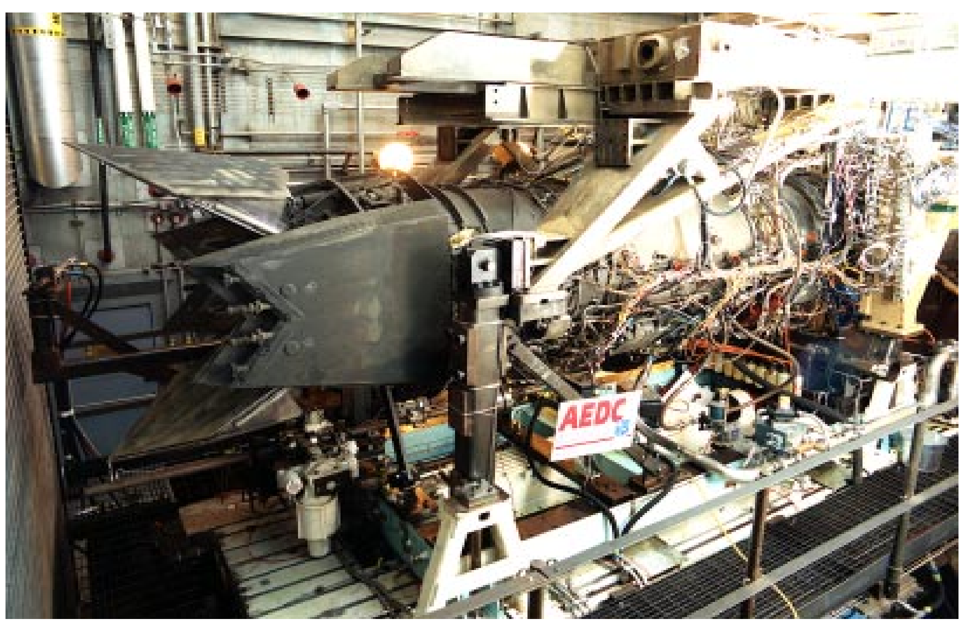


Photo no. 0105806

The Pratt & Whitney F119 engine for the F-22 undergoes testing in AEDC's Sea Level Test Cell SL-2.

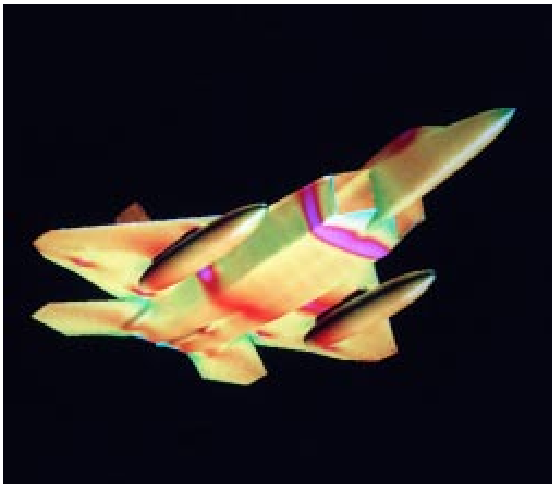


Photo no. 93-2516-16

AEDC engineers use Computational Fluid Dynamics to determine the flow fields around the Air Force's new F-22 fighter, shown here carrying external fuels tanks. Lockheed Martin built the F-22, which will replace the F-15 Eagle, and become the Air Force's front-line fighter. The F-22 is being tested in the center's aerodynamic wind tunnels. Its Pratt & Whitney F119 jet engine is also being tested in the center's altitude engine test facilities.

mean the difference between mission success and failure.

Unlike aircraft systems, ICBMs and launch vehicles generally are not recoverable for post-flight analysis.

AEDC supports the development and qualification of missile and space launch vehicle systems by testing at conditions that simulate launch, upper stage engine performance, separation and re-entry. The center:

- Tests small and full-scale models in wind tunnels at the appropriate launch, re-entry and flight conditions to determine flutter, stability, buffeting and control characteristics, base heating, and structural and functional adequacy both at maximum dynamic pressure and at other critical transonic and supersonic flight conditions;
- Test fires solid- and liquid-propellant rockets at simulated altitude conditions to determine performance and to verify the functional design characteristics of upper stage rocket motors and engines;
- Conducts stage separation tests of multi-stage launch vehicles, including jettisoning of strap-on boosters, and separation of escape capsules and payload fairings;
- Subjects models of re-entry vehicles, such as missile warheads or the space shuttle, to extreme high-temperature and high-pressure conditions to determine control, stability and structural adequacy, and to determine their ablation characteristics;
- Conducts aging and surveillance testing of operational rocket motors and penetration aids to determine any degradation in performance after long periods of storage;
- Performs integrated test and evaluation of missile stages to ensure operation of propulsion systems, avionics and control systems at simulated altitude conditions;
- Determines the degree of contamination from rocket motor exhaust on a spacecraft's optics and protective coatings;
- Validates the system's performance in the space environment.

SPACE SYSTEMS TESTING

U.S. military forces rely on space systems for surveillance, warning, communications, navigation and weather information to operate more effectively on land, sea and in the air.

A growing dependence on these space-based assets and the increasing threat against them are prompting the military to increase the survivability and capability of space systems.

Existing space treaties prevent in-orbit survivability testing and flight readiness verification. Spacecraft are produced in relatively small numbers, and in-orbit repair is difficult or impossible. In light of this, the value of a test facility that realistically simulates the space environment becomes readily apparent.

The center tests the space system in the environment it would encounter as it is launched, placed in orbit and while performing its mission. Specifically, AEDC:

- Calibrates infrared sensors to qualify them for production;
- Conducts thermal balance tests of spacecraft and propulsion systems under deep-space or in-orbit conditions;
- Determines the effects on hardware and software of system-generated charging and electrical arcing.

FLIGHT SIMULATION TESTING SAVES MONEY AND REDUCES RISK

Testing done at the center cannot completely replace a flight test, but it can significantly reduce the amount of flight test time, the risk associated with missed performance, and total development time and cost.

Testing in ground-based facilities allows careful precise control, observation and repetition of test variables to determine the effects on the test article.

A scale model of the C-17 Globemaster III with 15 remotely controlled surfaces is tested in AEDC's 16-foot transonic wind tunnel. The highly instrumented model and improved test techniques validated the design and saved an estimated $1 million in tunnel test time.

Photo no. 83-2239

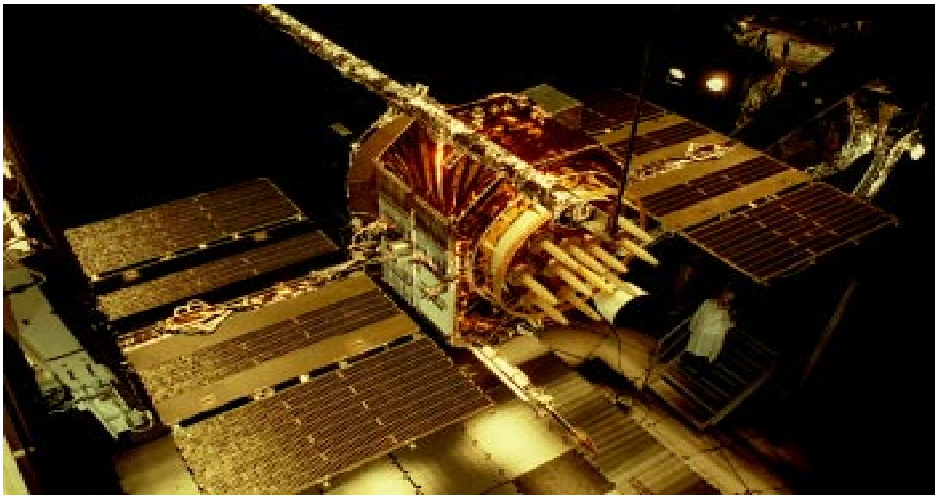


Photo no. 85-115611

This full-scale, Block 2 Navstar Global Positioning System qualification vehicle underwent a four-month thermal balance/vacuum test program in AEDC's Mark I aerospace chamber to qualify the satellite for production. During thermal balance testing, the satellite was exposed to a simulated space environment for a record-setting 45 straight days.

Photo no. 85-1156

An F-22 aircraft model is maneuvered to a very high angle of attack during wind tunnel testing in AEDC's 16-foot transonic wind tunnel. The test helped define performance along with aircraft stability and control.

- In most cases, the model for growth flight testing is less expensive than full-scale flight hardware.
- The cause of a performance/flight failure can be determined more easily with recoverable hardware during a ground test.
- And, flight tests can be conducted more safely with greater confidence in the system after the operational characteristics have been established in ground testing.

TESTING FACILITIES

AEDC's testing units are grouped into three major facilities, plus AEDC's remote operating location in White Oak, Md, Hypervelocity Tunnel 9.

Engine Test Facility (ETF) - Eleven turbine engine and four large rocket test cells are devoted to testing liquid- and solid-fueled propulsion systems for advanced aircraft, missiles, satellites and space launch vehicles.

ETF includes the world's three largest high-altitude simulation test cells for rocket propulsion systems. Horizontal cell J-5 can test solid-propellant rocket motors with thrusts up to 200,000 pounds. The vertical test cell J-4 is designed to test liquid- and solid-propellant rockets with thrusts exceeding 500,000 pounds. Both are capable of simulating altitudes of 100,000 feet.

Propulsion test cell J-6, a horizontal cell tests solid fuel rockets with thrusts up to 500,000 pounds at simulated altitudes up to 100,000 feet.

Another part of the Engine Test Facility complex, the Aeropropulsion Systems Test Facility, provides a capability for full-mission turbine engine simulation from take-off, through climb to altitude, multi-speed combat maneuvers, descent and landing.

ASTF is flexible enough to simulate transient conditions, and its two test cells are large enough to accommodate major portions of integrated propulsion systems (aircraft forebody, inlet, engine, and aircraft afterbody) or, in some cases, the complete propulsion system.

Photo no. 92-2232-36

The Pratt & Whitney 4084 started testing in 1992. The engine stands 10 feet tall, has a 112-inch diameter fan and a thrust capability in the 73,000 to 90,000-pound range. It powers the new Boeing 777. AEDC and Pratt & Whitney have a 20-year alliance to test the company's jet engines.

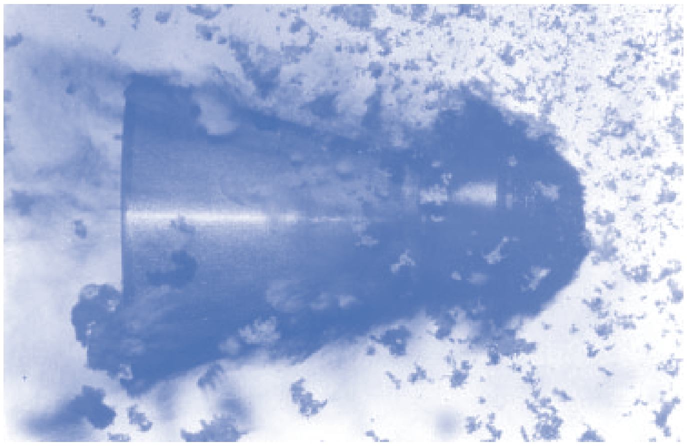


Photo no. 73-685

Models carrying candidate materials for re-entry vehicles can be launched free-flight in AEDC's hyperballistic ranges to determine the effects of the re-entry environment, such as snow and other abrasive elements in the atmosphere, on the materials. This model, is moving at more than 12,000 mph. The snowflakes are frozen in sharp detail through the use of a pulsed laser as a light source.

Photo no. 96-023403

AEDC testing of the Global Hawk in the center's 16-foot transonic wind tunnel provided aerodynamic characteristics, control surface effectiveness and drag information. AEDC also tested the Global Hawk's powerplant, the Allison AE3007 engine, in the Engine Test Facility.

Von Karman Gas Dynamics Facility (VKF) - Comprises three high-speed wind tunnels, four ballistic and impact ranges, three arc heaters and four space chambers. The wind tunnels are used to test the effect of airflow on relatively large-scale models of high speed aircraft and missiles at flight conditions from Mach 1.5 to 10.

Other hypervelocity testing is conducted in the VKF hyperballistic ranges that duplicate, rather than simulate, flight. Models can be fired down a closed range through simulated snow, rain or dust fields at velocities up to 20,000 feet per second to determine effects of erosion. Air pressure can be regulated to simulate altitudes from sea level to more than 240,000 feet. Models can be launched in free flight or guided along the range centerline by a track and recovered.

The ranges are also used to study the impact effects of natural or man-made debris on space vehicles and satellites. Three arc heater units, capable of simulating re-entry pressures and temperatures, are used to study ablation and erosion effects on re-entry vehicles. The VKF bird impact range is used to determine the effects of bird strikes on aircraft components such as engines and canopies.

High vacuum space chambers simulate space vacuum, solar radiation and the cold background of space. The vacuum chambers are used for full-scale spacecraft and subsystem tests, focal plane array and infrared sensor testing, and space contamination characterization and evaluation.

Propulsion Wind Tunnel (PWT) - One supersonic and three transonic wind tunnels comprise the PWT facility. During wind tunnel tests, conditioned air flows past a stationary model and flight characteristics are measured. The models can be positioned to simulate conditions found in actual flight.

Two 16-foot wind tunnels, one supersonic and one transonic, are used primarily to test the aerodynamic performance of large aircraft models and large or full-scale missiles. These two tunnels can also test engine/inlet compatibility.

The four-foot transonic tunnel is used primarily for store compatibility and separation testing. The one-foot transonic wind tunnel is used primarily in technology research to evaluate improvements to the four-foot and 16-foot transonic wind tunnels.

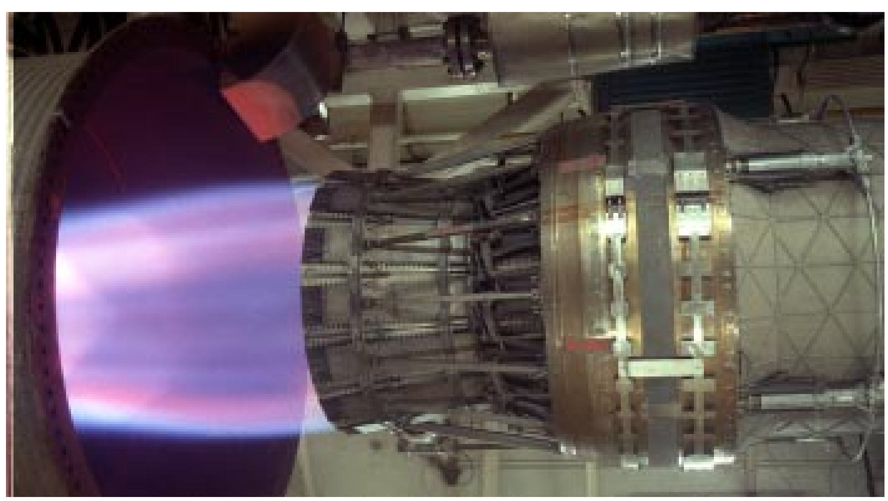


Photo no. 92-39014

A Ram Acceleration Mission Test (AMT) of the F100-PW-229 Increased Performance Engine for the F-15 Eagle. The term RAM refers to test conditions which simulate flight in the low altitude, high speed portion of a fighter aircraft's flight envelope. During a Ram-accelerated mission test, the engine is exposed to the pressure and thermal cycles that it will likely incur during a combat mission.

Hypervelocity Wind Tunnel 9 - This facility is the primary high Mach number, high Reynolds number facility for aerodynamic testing in the United States. This unique facility is located at AEDC's White Oak, Maryland site.

Tunnel 9's runtime of 15 seconds may not seem like a long time, but it's the quick runtime that makes it a world-class facility. When a test requires high temperatures and pressures, such as a shock tunnel, AEDC's Tunnel 9 is an excellent choice.

The test article is first put into a shock tunnel, and then air is blown over it. From that data, the engineer knows how the test article will perform at a certain orientation and speed.

Tunnel 9 provides aerodynamic simulation in critical altitude regimes associated with strategic offensive missile systems, advanced defensive interceptor systems, reentry vehicles, and hypersonic vehicle technologies. The maximum Mach number is 16.5, and using its unique storage heater, Tunnel 9 can provide temperatures up to 3,460 degrees Rankine and sustains long-duration, constant-condition runs.

Tunnel 9 contains two test legs to accommodate its multiple testing capabilities. Each leg contains a test cell that is five feet in diameter and more than 12 feet in length. These test cells can test full-scale re-entry bodies, full-scale endo-interceptors, large-scale aerospace vehicles and hypersonic inlet models.

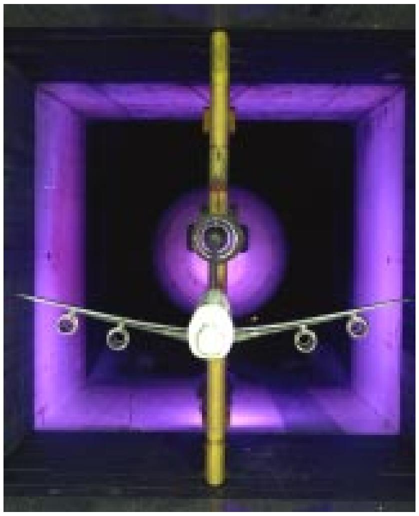


Photo no. 01-06402

The Boeing 747X inside AEDC's 16-foot transonic wind tunnel.

TEST SUPPORT

AEDC provides full spectrum test support that includes formulating and implementing test plans, acquiring, processing and analyzing test data, and certifying and reporting the test results.

In addition, the center has the capability to repair, build up, maintain and install test hardware. This manufacturing capability is necessary to modify test hardware and test cell configurations to meet constantly changing test needs.

Capabilities of the AEDC precision machine shop run the extremes — from 20-foot-diameter turnings and 40-ton millings to miniature parts a fraction of an inch in size.

Laboratory services ensure the reliability and accuracy of materials, instruments, equipment and test articles.

- A chemical lab analyzes fuels, gases and other materials before they are used to make sure they comply with specifications or test requirements.
- A metallurgical lab verifies the structural integrity of critical test hardware and facility components.
- A photo lab provides comprehensive still and motion picture coverage of tests, including high-speed photography at framing rates as fast as 11,000 frames per second. In the ballistic range area, a framing camera can shoot up to 1.4 million frames per second.
- A precision measurement equipment lab calibrates and repairs the instruments used to control and measure test conditions and to acquire data from the test articles. When standards exist, instrument calibrations are traceable to the National Institute of Standards and Technology.

AEDC's computational resources are used in all phases of testing, from pre-test planning and analysis to real-time acquisition, reduction and display of data from the test article and the simulated flight environment, to post-test data reduction for analysis. The center's efforts to improve test facilities and instrumentation are supported by computational fluid dynamics modeling capabilities. AEDC's high performance computing center is the ninth largest in the Department of Defense.

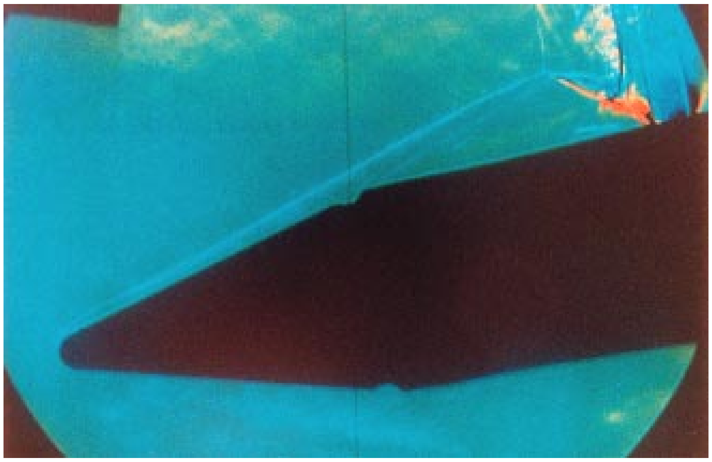


Photo no. 94-186112

Color schlieren of BMDO Theater High Altitude Area Defense Missile jet interaction test in a hypersonic wind tunnel

Photo no. 93-104815

Navy F/A-18 E/F Super Hornet inlet wind tunnel tests support the development of the Boeing F/A-18E/F in AEDC's 16-foot supersonic wind tunnel

The Lockheed Martin X-35 and Boeing X-32 Joint Strike Fighters have been tested in the 16-foot transonic wind tunnel. AEDC has tested both competitors for the Joint Strike Fighter. AEDC has also tested the JSF power plant variants being developed by Pratt & Whitney in the center's jet engine test cells. The JSF is scheduled to replace the F-16 and A-10 for the Air Force and early F/A-18s for the Navy and AV-8A Harrier aircraft for the Marine Corps and Royal Navy. Several other countries are also interested in the JSF. Both aircraft are in flight testing.

Photo no. 00-29306

Lockheed Martin X-35

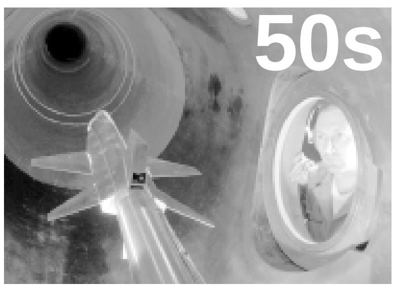
Photo no. 00-240-05

Boeing X-32

AEDC Test Facilities

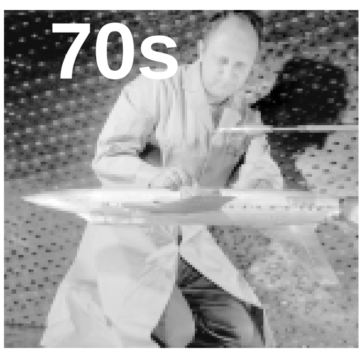
Wind Tunnels

16T *- 16-foot Transonic*
16S *- 16-foot Supersonic**
4T *- 4-foot Transonic**
Tunnel A *- Supersonic**
Tunnel B *- Hypersonic **
Tunnel C *- Hypersonic**
APTU *- Aerodynamic and Propulsion Test Unit**
Tunnel 9 *- Hypervelocity (AEDC White Oak, Md.)**



Ranges

G-Range *- Hypervelocity Range/Track**
I-Range***
S-1 *- Hypervelocity Impact Range*
S-3 *- Bird Impact Range*



Radiation

MBS *- Modular Bremsstrahlung Source*
Decade *- Radiation Test Facility**
Phoenix

Contamination

BRDF *- Bidirectional Reflectance Distribution Function*
COP *- Cryogaåenic Optical Properties Chamber*
SMOG *- Space Materials Outgassing Chamber*
SAM *- Solar Absorption Measurements Chamber*

Thermal Vacuum Chambers

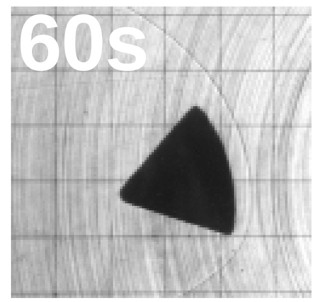
Mark I *- Aerospace Environmental Chamber*
12V *- Aerospace Chamber*

Sensor Test Facilities

FPCC *- Focal Plane Characterization Chamber*
DWSG *- Direct Write Scene Generator*
7V *- Aerospace Chamber**
10V *- Aerospace Chamber**

Arc Heaters

H-1 *- High-Enthalpy Ablation Test (HEAT) Unit**
H-2 *- High-Enthalpy Ablation Test (HEAT) Unit **
H-3 *- High-Enthalpy Ablation Test (HEAT) Unit**
HR *- Sensor Checkout*



Component Check Out

7A *- Vacuum**
UHV *- Ultra-High Vacuum*

Cryogenic Vacuum

4x10 *- Propulsion/Plume Effects Chamber*
CryoVac *- Cryogenic Vacuum*

Propulsion Research Cells

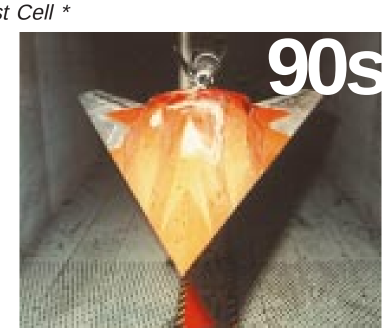
R1A1 *- Combustion Research Cell*
R1A2 *- General Research Cell*
R2A2 *- Freejet Research Cell*
R1D *- Icing & Severe Weather Simulation**
R1E *- General Research*
R2H *- Ultra-High Altitude Research Test Cell**

Rocket Altitude Test Cells

J-3 *- Vertical Liquid/Solid Rocket Test Cell**
J-4 *- Vertical Liquid/Solid Rocket Test Cell**
J-5 *- Horizontal Solid Rocket Test Cell**
J-6 *- Horizontal Solid Rocket Test Cell**

Gas Turbine Engine Test Cells

T-1 *- Propulsion Development Test Cell*
T-2 *- Propulsion Development Test Cell*
T-3 *- Propulsion Development Test Cell **
T-4 *- Propulsion Development Test Cell*
T-5 *- Propulsion Development Test Cell*
T-7 *- Propulsion Development Test Cell*
J-1 *- Propulsion Development Test Cell*
J-2 *- Propulsion Development Test Cell*
T-11 *- Small Turbine Engine Test Cell*
T-12 *- Turboshaft Engine Test Cell*
C-1 *- Aeropropulsion Systems Test Facility**
C-2 *- Aeropropulsion Systems Test Facility**



**Unique Facilities*

Major Systems Tested

Fighters

F-4 Phantom II, F-5 Freedom Fighter, F-14 Tomcat, F-15 Eagle/Strike Eagle, F-16 Fighting Falcon, F/A-18 Hornet, F/A-18 E/F Super Hornet, F-20, F-22 Raptor, F-105, Thunderchief, F-111 Aardvark, F-117A Nighthawk, LAVI (Israel)

X-15 Rocket Plane

Attack

A-6A Intruder, A-7 Corsair II, AV-8A Harrier, A-10 Thunderbolt II, A-37

Bomber

B-52 Stratofortress, B-58 Hustler, B-1 Lancer, B-2 Spirit, FB-111

F-105 Thunderchiefs with KC-135

Transports/Tankers/ Special Mission

C-130 Hercules, C-141 Starlifter, C-5 Galaxy, C-17 Globemaster III, KC-135 Stratotanker, E-3A (AWACS) Sentry, EF-111 Raven, V-22 Osprey

Trainers

T-37 Tweet, T-38 Talon, T-46, Dornier Alpha Jet

Experimental/Prototype

YA-9, YF-17, Microfighter, YF-23, X-32 and X-35 JSF Prototypes

X-Planes

XB-70 Valkyrie, X-29, XT-4 (Japan), X-15, X-24A, X-24B, X-24C, X-30 National Aerospace Plane, X-33, X-43, X-37

Space Shuttle

Unmanned Aircraft

Firebee, Global Hawk

Commercial

Boeing 747, Boeing 767, Boeing 777, Airbus

Air-to-Air Missiles

Advanced Medium Range Air-To-Air Missile (AMRAAM), Sidewinder

Cruise Missiles

Air Launched Cruise Missile, Ground Launched Cruise Missile, Navy Tomahawk Cruise Missile, Short Range Attack Missile (SRAM)

Intercontinental/Submarine-Launched Ballistic Missiles

Polaris, Poseidon, Trident, Atlas, Titan, Minuteman, Peacekeeper

Other Missiles Tested

Quail, Army Sergeant Missile, Bomarc, Hedi, Little John, Maverick, Navy Standard Missile, Nike-Zeus, Patriot, Army Pershing, Snark, Sprint, Thor-Delta, Walleye, THAAD

Apollo spacecraft takes man to the moon

Manned Space Programs

Mercury, Gemini, Apollo, Skylab, Dynasoar, Space Shuttle, MOL (Manned Orbiting Laboratory), Space Station

Satellites and Space Probes

NAVSTAR Global Positioning Satellite, Transtage, IUS, Pam, Star 12-48, Discoverer, Voyager, FLTSATCOM, Intelsat VI, Miniature Vehicle, Eris, Sagittar, Pathfinder, Space Probe, Viking, NOAA/GOES-M, NASA-MAP

Space Launch Rockets

Atlas, Saturn V, Scout, Titan II, Titan III, Titan 34D, Vanguard, EELV

Gas Turbine Engines

Pratt & Whitney

- TF33 (B-52, KC-135),
- F100 (F-15/F-16),
- F119 (F-22/JSF),
- 4084/4090/ 4098 (Boeing 777)

F-117 Nighthawk Stealth Fighter

General Electric

- J-85 (T-38, F-5, A-37),
- F101 (F-16, B-1),
- F110 (F-16, F-14),
- F404 (F-117A, F/A-18), F414, (F/A-18E/F)
- TF39 (C-5)

Rolls-Royce - F402 Pegasus (AV-8B Harrier), Trent 800 (Boeing 777)

Orneda - Iroquois - (AVRO CF-105 Arrow)

Williams - F415-Wr-400 (Tomahawk)

Allison - AE3007 (Global Hawk, Embraer 145, Citation X)

AEDC Public Affairs • 100 Kindel Drive Suite B-213 • Arnold AFB, TN 37389-2213
(931) 454-5586 • DSN (931) 340-5586

For information on AEDC visit our Website at www.arnold.af.mil

Release # 2001-094